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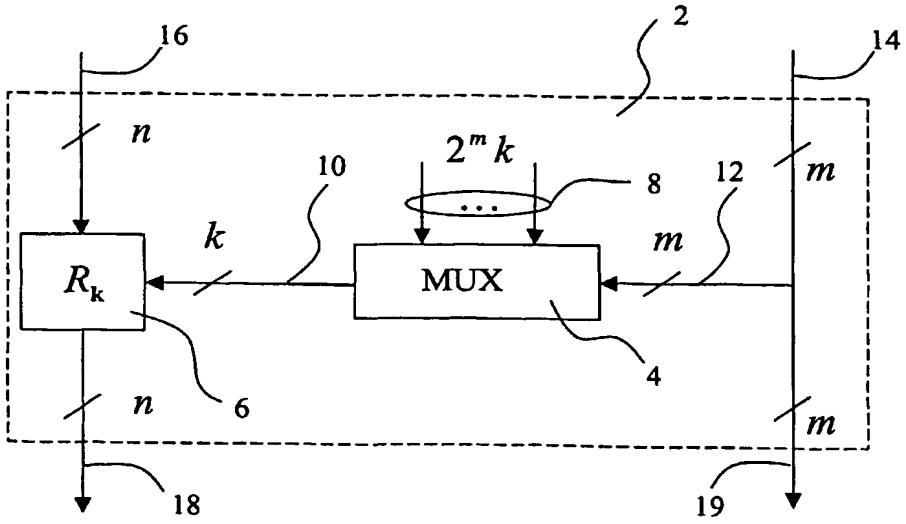
(54) Title: SECRET-KEY-CONTROLLED REVERSIBLE CIRCUIT AND CORRESPONDING METHOD OF DATA PROCESSING



(57) Abstract: A combinatorial key-dependent network (46), suitable for the encryption/decryption of data on buses and in memories of data-processing devices, comprises a number of layers, where each layer is composed of a number of elementary building blocks (2) operating on very small block sizes. A generic building block (2) acts on a small number of input data bits, which are divided into two groups of m and n bits, respectively. The m input bits, which are passed to the output intact, are used to select k out of 2^mk key bits by a multiplexer circuit; the k bits are then used to select an (nxn)-bit reversible transformation (R_k) acting on the remaining n input bits to produce the corresponding n output bits. The total number of the key bits in the building block is thus 2^mk, which can easily be made larger that m+n. An inverse building block is the same except that the reversible transformations RK are replaced by their inverses Rk-1.

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